Method, System, and Program
To Record Sound to Photograph and to Play Back

DESCRIPTION

[Para 1] FIELD OF THE INVENTION

[Para 2] The personal and commercial talking photographs and pictures.

[Para 3] BACKGROUND OF THE INVENTION

[Para 4] Technologies, which integrate sound and photograph together, were disclosed. [US Patent 5,520,544 Manico, et al.; US Patent 5,313,235 Inoue, et al.] But, all of them record the sound on somewhere else instead on the photograph itself, and do not use the 2-dimensional barcode.

[Para 5] The 2-dimensional barcode possesses a sufficient capacity to store information. QR barcode can record about 3000-byte message. Other types of barcode like MICRO PDF, SOFTSTRIP and DATACODE can store more information. The decode error rate of the PDF417 barcode can be low as to 10^{-7} and the barcode's error recover ability can be high as to that the lost information can be recovered even 49% PDF417 barcode is damaged.

[Para 6] By using sound data compression technology, 10000 bytes MWA format file can hold 5 seconds speech, 5000 bytes MIDI format music file can be played last to 5 minutes.

[Para 7] The microphone, various recorders and the Personal Computer provide the means for creating digital sound data; the printer, the optical

scanner, digital camera, the cellular phone with embedded camera and the Personal Computer provide the means for recording and read back the 2-dimensional barcode onto and from a photograph or picture.

[Para 8] SUMMARY OF THE INVENTION

[Para 9] Using microphone, various recorders and Personal Computer, users can convert the sound into digital data, then by encoding, generate a 2-dimensional barcode of the sound data. Using ordinary printer, the 2-dimensional barcode of sound data can be printed onto a photograph or picture. Using the general optical scanner, or digital camera header, or the handhold 2-dimensional barcode reader, the 2-dimensional barcode can be read back into the Personal Computer from the photograph with the software which will decode the barcode.

[Para 10] Thus, with a Personal Computer, include the desktop PC, the laptop PC, the palm PC, the PDA, the cellular phone, the digital camera and any other computer, plus the sound recording device, printer, and optical scanner or digital camera header, the ordinary users can record and play back their voice or song or any sound to and from their photograph; or record and play back the music to and from a scenic picture or postcard; or record and play back their greeting speech to and from their greeting card.

[Para 11] BRIEF DESCRIPTION OF THE DRAWINGS

[Para 12] Fig1 shows the 1-dimensional (left) and the 2-dimensional (right) barcode.

[Para 13] Fig2 shows the system to record and play back the sound to and from a photograph.

[Para 14] Fig3 shows method and software program modules to record and play back the sound to and from a photograph.

[Para 15] Fig4 are two embodiments of the system, which play back the sound from the photograph.

[Para 16] Fig5 is another embodiment of the system, which plays back the sound from the photograph.

[Para 17] DETAILED DESCRIPTION OF THE INVENTION

[Para 18] Fig1 shows the typical patterns of picture of the 1-dimensional barcode and 2-dimensional QR barcode. The latter contains more data than former. Put multiple barcode together can record sound with much longer period.

[Para 19] In the Fig2, the top half shows a record process. Using microphone 2, various recorder 3, digital camera 4, the Personal Computer 1 inputs the sounds and produces digital sound data 7. After compressing and encoding, the Personal Computer 1 produces a 2-dimensional barcode 8. Then, printer 10 prints this 2-dimensional barcode to photograph 5, which appear as a graphic picture. The bottom half of Fig2 shows the play back process. The optical scanner 6 scans the graphic picture on the photograph 5 as a 2-dimensional barcode 8. Personal Computer 1 recognizes and decodes the 2-dimensional barcode 8 to generate the digital sound data 7, finally plays the digital sound data 7 via the speaker 9.

[Para 20] Herein, the photograph 5 can also be any picture, postcard or greeting card. The Personal Computer 1 includes desktop, laptop, palm, PDA, cellular phone, digital camera or any other computer, which comprises a data processor like CPU, DSP, micro controller to process the 2-dimensional barcode and sound data, a memory like RAM, FLASH memory to store the program and the 2-dimensional barcode and sound data, a input port to enter the digital sound data, a output port to print the 2-dimensional barcode, a

input port to scan the 2-dimensional barcode and a output port to play the sound. The optical scanner 6 includes also the digital camera, the digital camera header, or cellular phone with embedded camera and handhold barcode reader. The printer 10 can be any high- resolution ink jet or laser printer.

[Para 21] Fig3 shows the software program modules, which installed in a Personal Computer to record sound onto photograph and play back. The software program consists of a user friendly graphic interface 20; a data acquisition module 21 to interface with sound data acquisition device and produce digital sound data; a compressing and encoding module 22 to produce 2-dimensional barcode; a printing module 23 to print 2-dimensional barcode onto a photograph, which appear as a graphic picture; a scanning module 24 to control optical scanner to scan the photograph to obtain 2-dimensional barcode; a recognizing and decoding and uncompressing module 25 to generate digital sound data from the 2-dimensional barcode, and a playing module 26 to play the digital sound data.

[Para 22] Fig4a is an embodiment of the system to scan a 2-dimensional barcode printed on a photograph and to play back the sound. A small-embedded computer 16 is integrated into a small CCD optical scanner 11. A photograph 15 is laid on the top 14 of the scanner. By pressing the play button 12, the small embedded computer controls the scanner to scan the 2-dimensional barcode printed on back of the photograph, recognizes and decodes and uncompress the 2-dimensional barcode, generates the digital sound data and plays the data via the speaker 13. In the Fig4b, the small embedded computer is removed from the scanner 11, a cellular phone 17, or a palm PC, or a PDA, or a laptop PC, or a desktop PC is connected to the scanner 11 to control the scanner and to play the sound. The small scanner also can be any digital camera header to shoot the 2-dimensional barcode symbol.

[Para 23] Fig5 shows the method using handhold barcode reader 34 to reproduce the sound from the photograph 32. By pressing the scan button 35, the small embedded computer 37 controls a infrared emission-receiver to read in the 2-dimensional barcode 31 on the side of the photograph 32, recognizes

and decodes and uncompress the 2-dimensional barcode, generates the digital sound data. By pressing the play button 36, the Small embedded Computer 37 plays the digital sound data using a small speaker 39.

[Para 24] Except using the handhold barcode reader, users can use the camera embedded in any cellular phone to shoot the 2-dimensional barcode on the photograph; a program running in the cellular phone can process the 2-dimensional barcode and play back the sound. Or, users can use any digital camera to shoot the 2-dimensional barcode on the photograph; a program running in the digital camera can process the 2-dimensional barcode and play back the sound.